Space Weather Forecast

Issued on Tuesday, 17 September 2024 at 13:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME arrived late 16 Sep. Minor to Moderate (G1-G2) geomagnetic storms Expected Day 1 (17 Sep), activity declining by Day 2. Ongoing S1/Minor Radiation Storm, Chance this continues into Day 2. Ongoing Chance of Moderate-class x-ray flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Low, with occasional Common-class x-ray flares observed, peaking with one at 16/2356 UTC from a complex sunspot group in the southeast.
There are currently nine sunspot regions on the visible disc. The largest and most complex is the region (in the southeast) that was responsible for the UTC weekend's Strong-class x-ray flare. This region has seen an increase in its magnetic complexity through the last 24 hours. Also of note was a second region in the southwest, which saw proliferation of minor central spots followed by a spreading tendency. Remaining groups were either more simple magnetic dipoles or else apparently unipolar.

No Earth-directed Coronal Mass Ejections (CMEs) were in evidence in the period.

Solar Wind / Geomagnetic Activity: Solar wind parameters showed ongoing slightly elevated solar wind speeds around 450 km/s. However, at 16/2250UTC a CME arrival resulted in a sudden rise in winds to around 520-550 km/s. Wind speeds have since remained mostly Elevated, but have fallen to around 500-520 km/s in recent hours.
The magnetic field was as weak to moderate, rising sharply after the CME's onset to become elevated. The important north-south component fluctuated weakly initially but was largely positive, however, in the wake of the CME shock has since strongly fluctuated and been predominantly negative. The net result of the above solar wind measures was a peak G4/Severe Geomagnetic Storm (Kp 8) interval before gradually declining to current G1/Minor Geomagnetic Storm levels (Kp 5).

Energetic Particles / Solar Radiation: Solar radiation was slightly above normal background levels following the generative Strong-class x-ray flare on 14 September. Levels rose to S1/Minor Solar Radiation Storm around 17/0725 UTC and have continued to rise.

Four-Day Space Weather Forecast Summary
Solar Activity: Low to Moderate activity is forecast, with a chance of Moderate-class flares. There is a slight chance of an isolated Strong-class flare from the southeastern sunspot group especially given its history. No significant regions are expected to arrive or depart in the period and the risk is deemed roughly constant as a result.

Solar Wind / Geomagnetic Activity: The main inbound CME from the Strong class-related CME on 14 September has now arrived (and the 13 September CME which it may have swept up). Further G1/Minor Geomagnetic Storm intervals are expected with a chance of G2/Moderate Geomagnetic Storm interval during the UTC afternoon of Day 1 (17 Sep). Earth may also already be encountering one of the forecast streams of fast winds from coronal holes and this

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has probably now peaked. A second coronal hole fast wind from may arrive late Day 2 or 3 (18 or 19 Sep), with Slightly Elevated to Elevated speeds possible.

Energetic Particles / Solar Radiation: Solar radiation is currently at S1/Minor Storm levels. Levels are expected to peak at S1 on Day 1 (17 Sep) before waning during Day 2 (18 Sep) and returning to background Days 3-4. The slight chance of S1 later in the period takes into consideration the potential for enhancement from the active sunspot regions.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	100	20	10	1
Strong	G3	Yes	5	1	1	1
Severe	G4	Yes	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	40	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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